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**Final  
Archaeological Inventory Survey Report  
For the City Center (Section 4) of the  
Honolulu High-Capacity Transit Corridor Project,  
Kalihi, Kapālama, Honolulu, and Waikīkī Ahupua‘a,  
Honolulu (Kona) District, Island of O‘ahu  
TMK: [1] 1-2, 1-5, 1-7, 2-1, 2-3 (Various Plats and Parcels)**

**Volume VIA**

**GPR Results:**

**Zone 1 West Kalihi (Test Excavations 1 through 20A)**

**Zone 2 East Kalihi Test Excavations 21 through 47)**

**Zone 3 West Kapālama (Test Excavations 48 through 53)**

**Zone 4 East Kapālama (Test Excavations 54 through 84)**

**Zone 5 Iwilei (Test Excavations 85 through 95)**

**Zone 6 Downtown Waterfront (Test Excavations 96 through 115)**

**Prepared for**

**The City and County of Honolulu**

**and**

**The Federal Transit Administration**

**On Behalf of**

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## Section 1 Background

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The use of Ground-Penetrating Radar (GPR) for this study was specifically dictated in the HHCTCP Programmatic Agreement. The purpose of this investigation was to evaluate the efficacy of GPR surveys within the context of urban Honolulu, to test this method’s ability to map stratigraphy, as well as locate subsurface cultural deposits, including human burials. The subsurface mapping capabilities and depth information that can be acquired by GPR make it a promising geophysical technique for imaging stratigraphy and subsurface features of interest, especially human burials. As there are a number of archaeologically sensitive areas within the HHCTCP project corridor it is important to assess whether or not sensitive cultural deposits (i.e., human burials) can be located and mapped in a non-invasive way. Additionally, this study seeks to improve the effectiveness of GPR data analysis through “ground truthing” (comparison of GPR results with actual excavation results).

Previous GPR surveys conducted in nearby locations have demonstrated the potential of GPR to map stratigraphy and subsurface features, though overall depth penetration and feature resolution remain a concern (O’Hare et al. 2009; Pammer et al. 2009). A preliminary GPR investigation for the HHCTCP project conducted by TAG Research by Sturm Inc. sought to evaluate and test which antenna frequencies, collection parameters, and processing procedures would be the most effective for potentially mapping and identifying the cultural features of interest (Sturm 2010). Sturm (2010) concluded that “GPR mapping has use and potential for imaging buried features in this urban environment” (Sturm 2010: 34). Additionally, Sturm recommends that a 400 MHz antenna be utilized to conduct the HHCTCP GPR survey, as it “provided the best overall quality data, allowing high resolution mapping of target features of interest (including burials) to a depth of approximately 1 to 1.5 m” (Sturm 2010: 4).

This report also intends to offer a reference for future archaeological work within or near the study area that could benefit from the use of GPR analysis to investigate stratigraphy or potentially identify cultural layers or features. The work is presented in a way that allows the reader to directly compare the GPR results to “ground-truthed” excavation results. The report provides a detailed description of field methods, survey methodology, data collection parameters, post-processing, and an interpretation and summary section. The size and scope of this investigation provides a rare opportunity to interpret an intermittent GPR cross-section through one of Hawaii’s more developed urban environments.